

Unified Enterprise Modelling Language (UEML) and ISO 15926

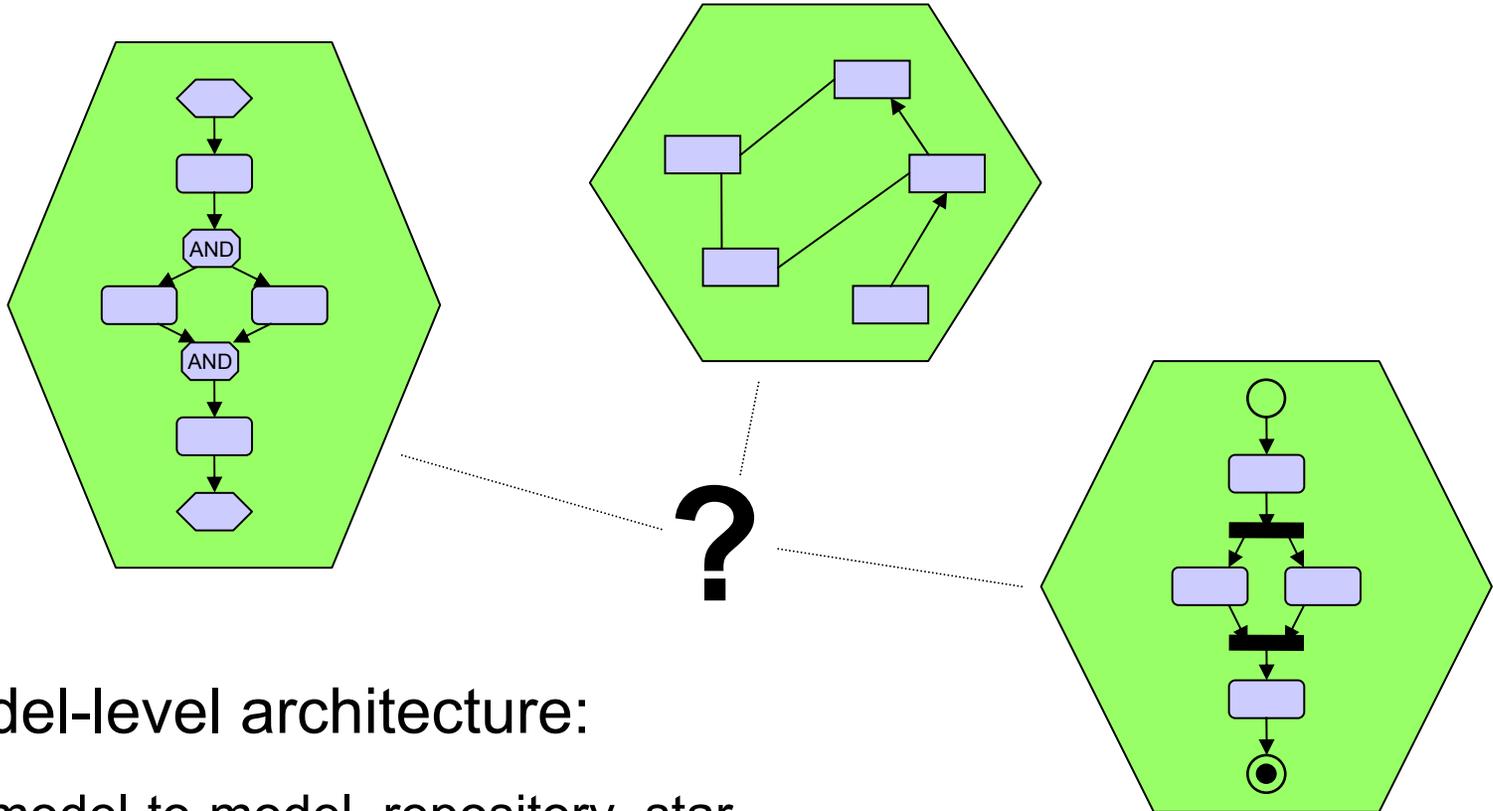
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- Themes:
 - Unified Enterprise Modelling Language
 - UEML and interoperability
 - *FP7 STREP-application in the works*
 - UEML and standardisation
 - *NFR-application in the works*



Unified Enterprise Modelling Language

- *An intermediate language for integrated use of enterprise models expressed in different languages*
 - ICEIMT'97: Enterprise Integration and Modelling Technology
 - Vernadat (2002): Towards a Unified Enterprise Modelling Language, *Int. J. Production Research* 40(17)
- UEML Thematic Network (2002-2003)
 - integrative metamodel of 20 concepts
 - derived from industrial languages
- Interop Network of Excellence (2003-2007)
 - U Bergen, U Stockholm, U Torino, U Namur, U Nancy, U Nantes, UP Valencia
 - Unified Enterprise Modelling Language “version 2”
- Several national and international project proposals



- Model-level architecture:

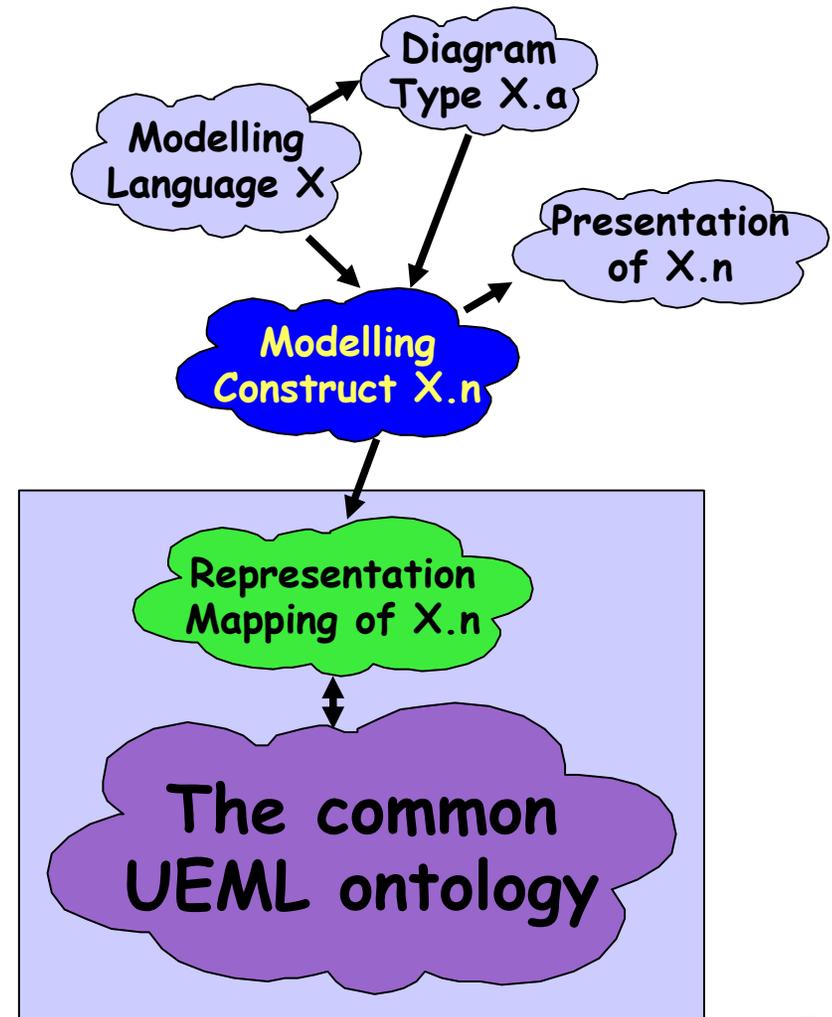
- model-to-model, repository, star
- transiently, in-model metadata, external mapping data

- Language-level architecture:

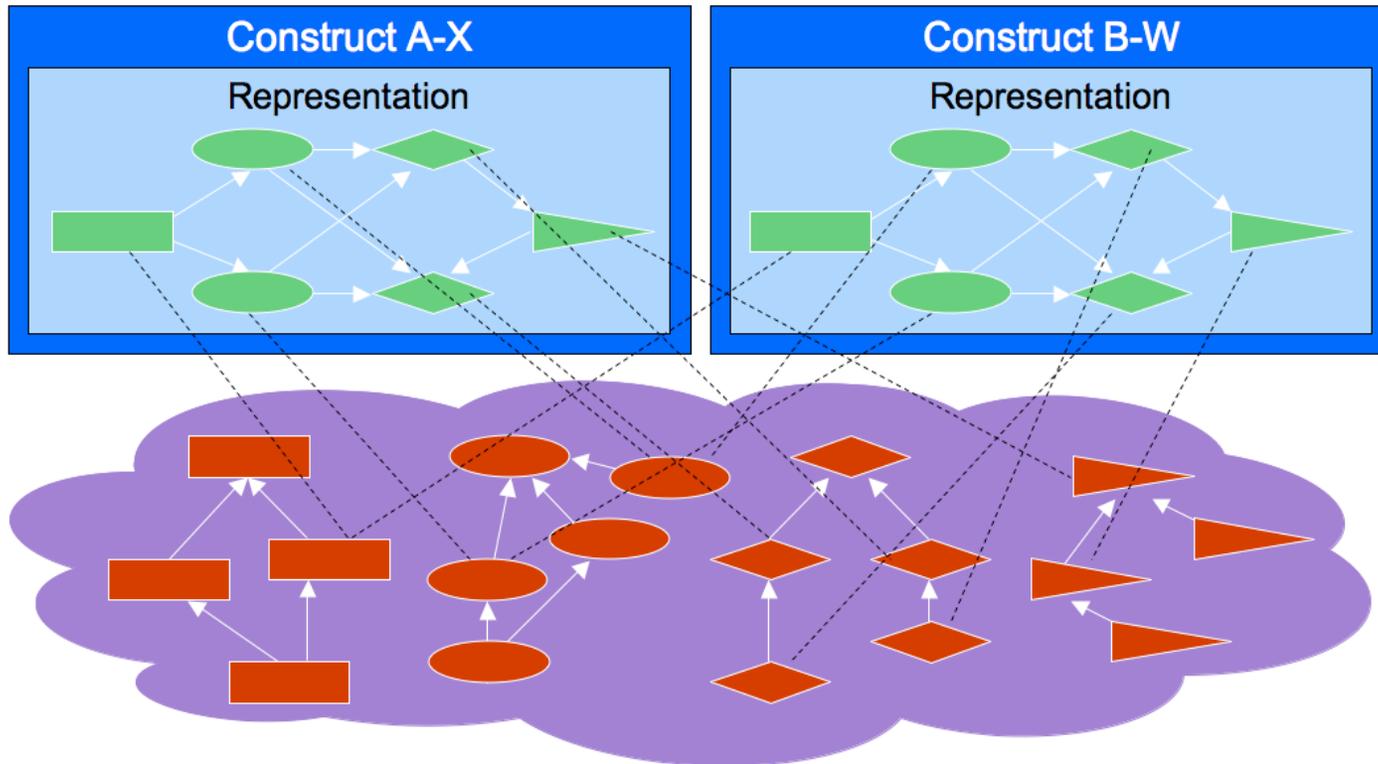
- language-to-language, repository, star
- in-language metadata, external transformation data

UEML – Language description structure

- A language comprises *diagram types* and *constructs*
- Constructs have one or more *presentations* (concrete syntaxes) and a single *semantics*
- The semantics is
 - partly *mathematical*
 - partly *representational*
- **The representational semantics is a *representation mapping to a common ontology***

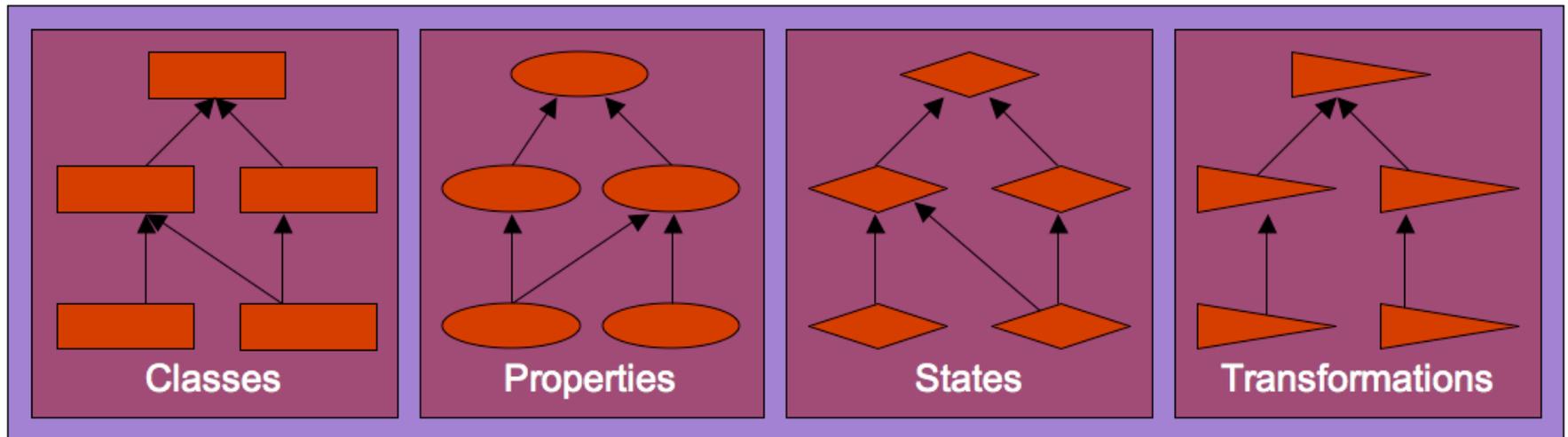


UEML – Representation mapping



- Separation of reference leads to tightly integrated ontological scenes → fine-grained integration
- Hierarchic relations provide an handle on *information loss*

UEML – The common ontology



- Four *interrelated taxonomies*
- Ensures that
 - precise *semantic relations* can be identified
 - the ontology *remains structured* as it grows

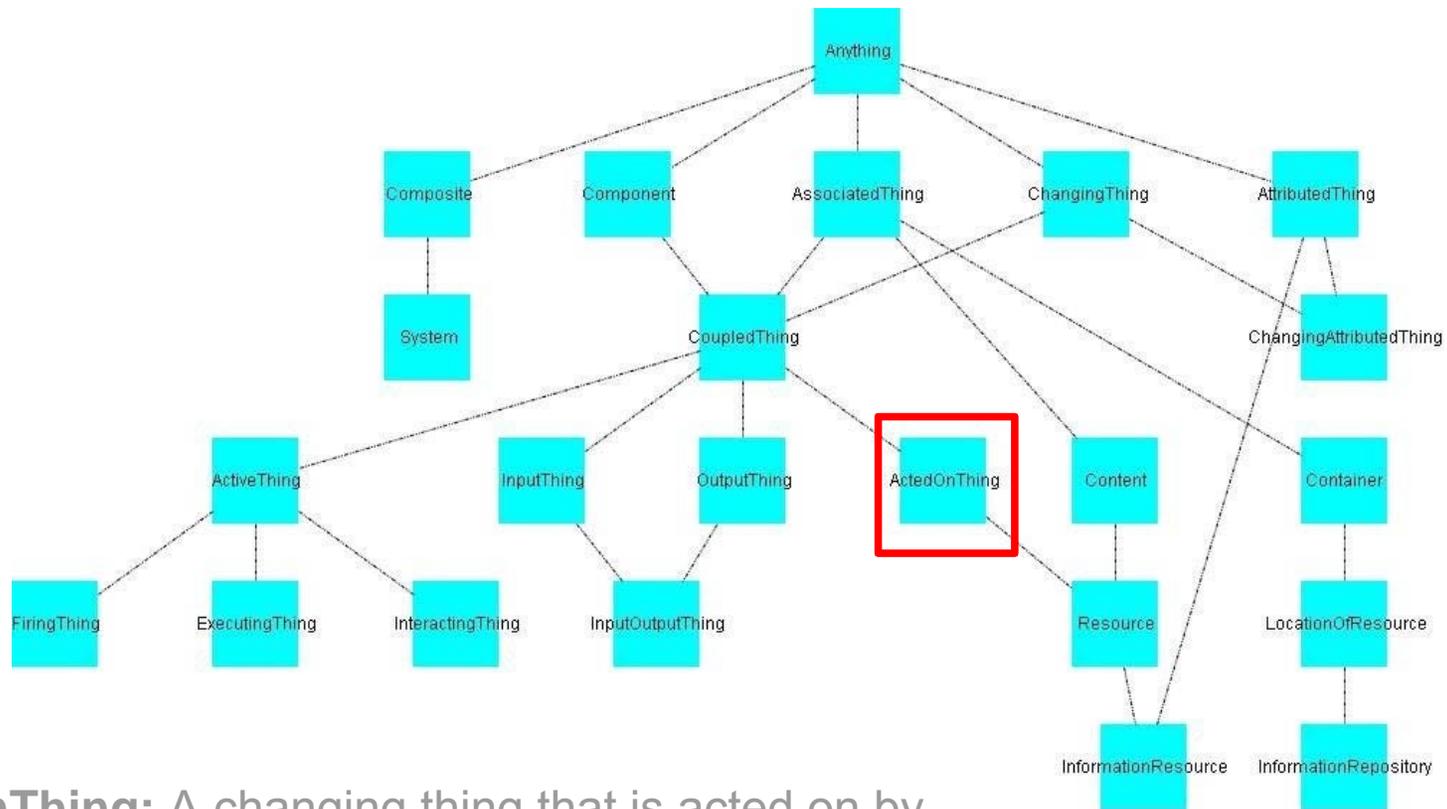
UEML – Results so far

- Languages and constructs described:
 - ARIS, BMM, BPMN, coloured Petri nets, GRL, IDEF3, ISO/DIS 19440, KAOS, UEML 1.0, UML 2.0 (Class & Activity Diagrams)
 - 130 constructs from 10 languages
- Common ontology established with 110 concepts
- Language quality and selection framework
- Early correspondence analyses
- Tools, documentation, tutorials, proofs-of-concept
- *The description approach works!*
 - distributed setting, many people involved
 - many, large industrial languages analysed
- But *interoperability in practice* is not demonstrated in depth



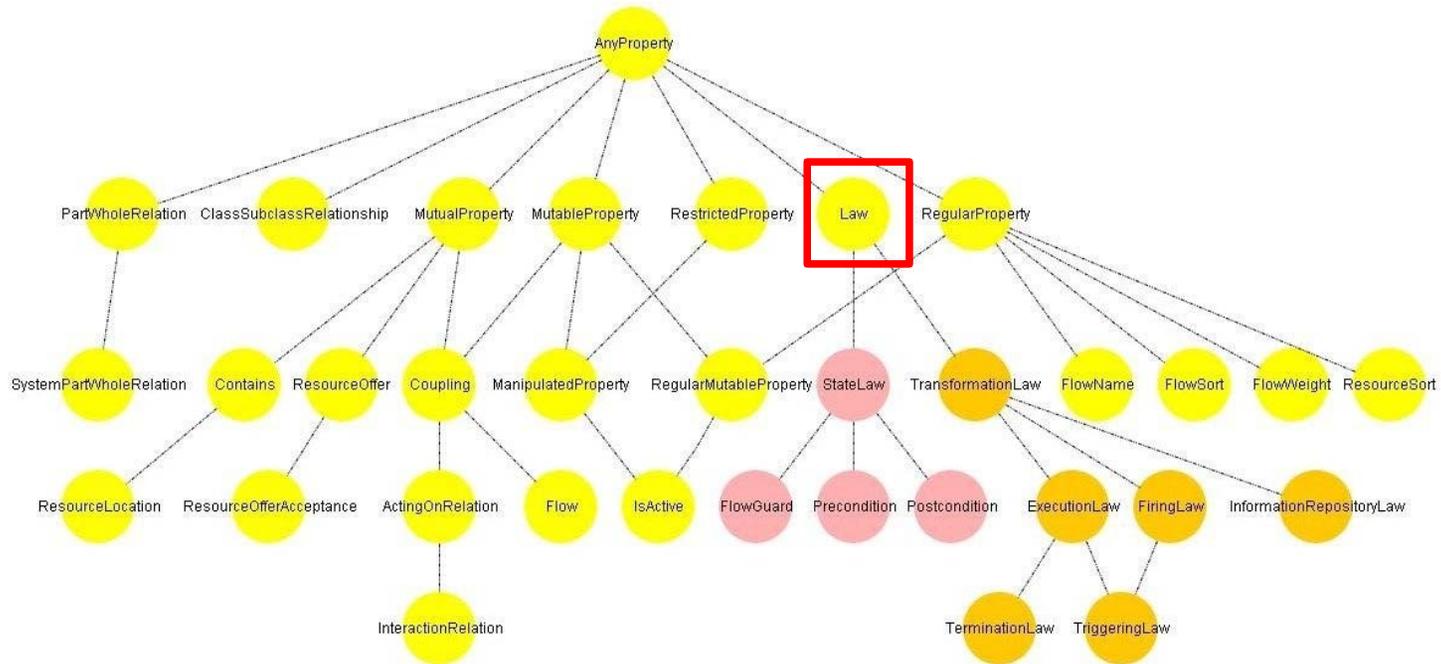
– several proof-of-concept examples presented

Evolving Ontology Class Taxonomy



ActedOnThing: A changing thing that is acted on by at least one other thing through an acting-on relation, which is a particular type of coupling. In addition, the acted-on thing may possess a state law, which restricts the combinations of properties that the acted-on thing can possess at the same time.

Evolving Ontology Property Taxonomy



Law: A property that restricts the value of other properties of the same thing (its restricted properties) and that is not mutual, a part-whole relation or a class-subclass relationship. The restricted properties of a law must be sub-properties of the law. (This may be an extension of Bunge and the BWW-model. But at least it is clear from Bunge and the BWW-model that a law property is always preceded by the properties it restricts.)



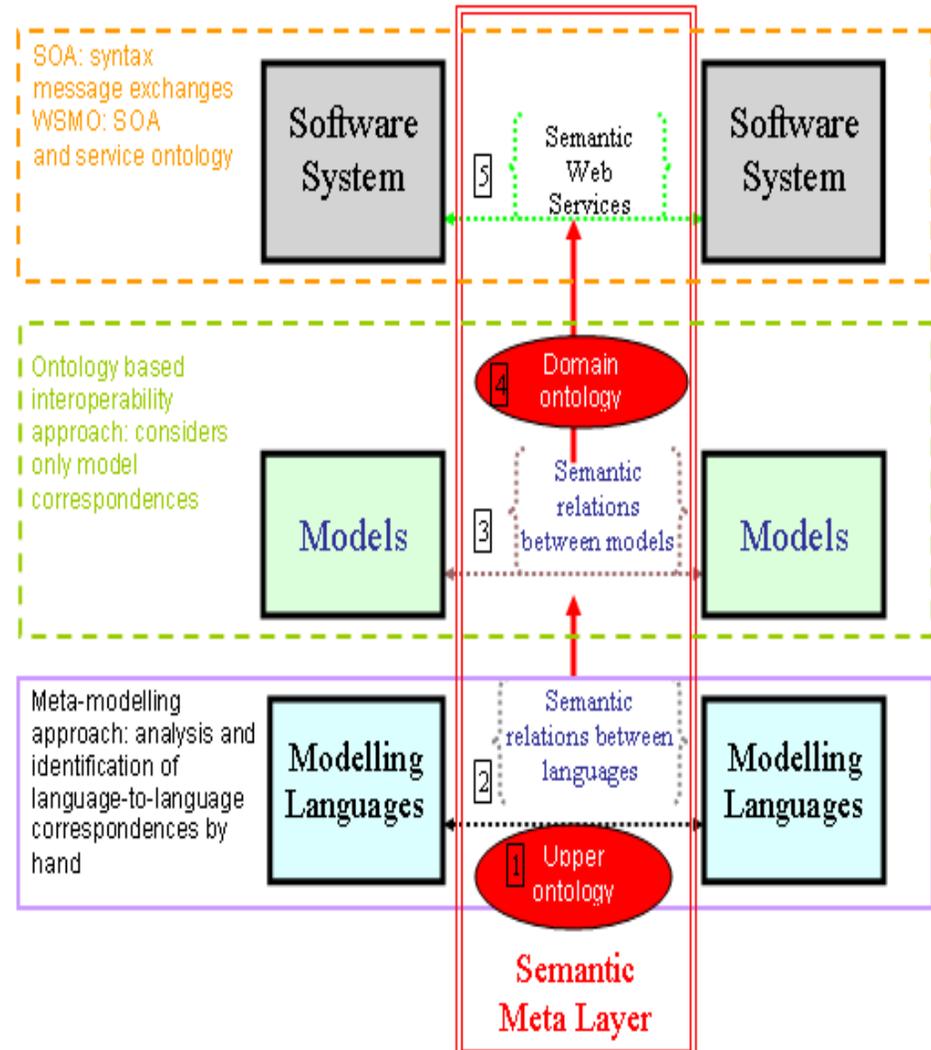
UEML – Open issues

- Computer-scientific versus *philosophical* ontology
- Mathematical versus *ontological* formality
- Possible further developments:
 - model-driven software services
 - domain-specific languages
 - standard-specific languages



STREP-proposal for FP7

- Spontaneous Semantic Software Service Interoperability (S4I)
- *Model-driven web services*
- Established consortium:
 - Altec
 - DFKI
 - Sodius
 - U Bergen
 - U Nantes
 - U Syd-Bretagne
 - UP Valencia
 - ...more...



UEML and ISO15926

- *Enterprise and IS modelling can become a central aid in realising standards*
- Information modelling(!)
- Process modelling using *concepts from ISO 15926*:
 - domain-specific process modelling languages
 - hide some of the added complexity
 - encourage use of ISO 15926 concepts when understanding and improving the enterprise
 - interoperability with existing models and other assets
 - present existing assets using ISO 15926 concepts
- Also many other domain-specific model types:
 - product lines, goals & agents, value objects, services...
 - integrate 15926-templates in enterprise/IS models



NFR-proposal for VERDIKT

- Domain-specific Interoperable Enterprise Modelling
(for 25. november)
 - domain specific modelling languages (DSLs) that support standards (ISO 15926 as case)
 - *How can UEML support domain-specific interoperable enterprise and IS modelling using concepts from the ISO 15926 standard?*
 - UEML:
 - used to define and manage the DSLs
 - ensures that the languages and models *remain interoperable*
 - aid conversion to/from existing assets
 - aid learning and use of ISO15926 and its concepts

